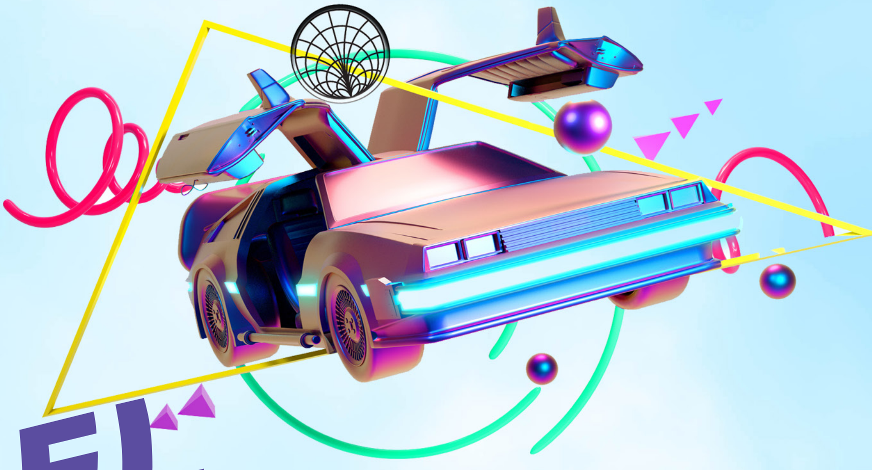

Recognizing Heinrich Hertz at Kiel University

TIME TRAVEL

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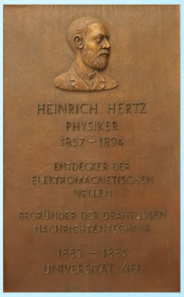
The electronics industry owes a significant debt of gratitude to Heinrich Hertz. Hertz, born in 1857, was the first scientist to prove the existence of electromagnetic waves, confirming James Clerk Maxwell's theory and paving the way for understanding wave phenomena and modern technologies like radio communications. After completing his doctorate at the Friedrich-Wilhelms-Universität, which was renamed Humboldt-Universität in 1949, in Berlin, he won a two-year postdoctoral scholarship in Kiel. He then spent time at the Christian-Albrechts-Universität zu Kiel, also known as Kiel University, in northern Germany, near Hertz's birthplace and family in Hamburg.[1] While in Kiel, Hertz completed his Habilitation thesis on experiments with electrical discharges that he had conducted in Berlin. Due to the lack of an experimental laboratory in Kiel, he concentrated on the theory. He was fascinated by the recently proposed but still not widely accepted Maxwell's formulas on electromagnetic waves. The most important and brilliant theoretical contribution he made in Kiel[2] was to bridge the gap between Maxwell's theory and the opposing "gegnerische" electrodynamics, mainly developed in continental Europe. In his paper,[2] Hertz derived the following system of equations in free space:

$$\begin{cases} A\frac{dL}{dt} = \frac{dZ}{dy} - \frac{dY}{dz}, & A\frac{dX}{dt} = \frac{dM}{dz} - \frac{dN}{dy} \\ A\frac{dM}{dt} = \frac{dX}{dz} - \frac{dZ}{dx}, & A\frac{dY}{dt} = \frac{dN}{dx} - \frac{dL}{dz} \\ A\frac{dN}{dt} = \frac{dY}{dx} - \frac{dX}{dy}, & A\frac{dZ}{dt} = \frac{dL}{dy} - \frac{dM}{dx} \end{cases}$$

Where:
X, Y, Z (L, M, N) are the x, y, z components of the magnetic (electric) field t = time, and A = the inverse of the speed of light.

This system of equations represents the current form of the two Maxwell's curl equations in the CGS system. In addition, it describes a vacuum with only one medium constant, the speed of light, A^{-1}, instead of two constants, ε_0 and μ_0, as Maxwell's equations require. Consequently, no "ether" is needed for electromagnetic wave propagation in a vacuum.

Recently, Hertz's time in Kiel has received proper attention.[3] One of the lecture halls in the new engineering building, as shown in **Figure 1**, is now known as the Heinrich Hertz-Hörsaal. The plaque, dedicated to Hertz, shown in **Figure 2**, has been relocated from the television tower in Kiel to the building at Kiel University.



HEINRICH HERTZ
PHYSICIST
1857-1894

DISCOVERER OF THE ELECTROMAGNETIC WAVES

FOUNDER OF THE WIRELESS COMMUNICATION ENGINEERING

1883-1885
KIEL UNIVERSITY

Fig. 1 (top) The new Faculty of Engineering building at Kiel University housing the Heinrich Hertz Lecture Hall. (Source: www.uni-kiel.de/en/tf)

Fig. 2 (bottom) Plaque dedicated to Hertz in the new lecture hall and translation of the inscription.

References

1. A. Fölsing, "Heinrich Hertz - Eine Biographie," Hamburg, Germany: Hoffmann und Campe, 1997.
2. H. Hertz, "Über die Beziehungen zwischen den Maxwell'schen electrodynamischen Grundgleichungen und den Grundgleichungen der gegnerischen Electrodynamik," Annalen der Physik, Vol. 259, No. 9, 1884, pp. 84–103.
3. G. Giannetti and L. Klinkenbusch, "The contributions to electromagnetism achieved by Heinrich Hertz at Kiel University," IEEE History of Electrotechnology Conference, Sept. 2023, pp. 1–3.